

REMARKS

Claims 1-30, 32 and 35 are pending and stand rejected.

Claim 1 was amended to include the limitations of claim 2. Claim 2 has been cancelled without prejudice.

Claim 35 was amended to place an upper cap on the thickness required for each layer. This amendment is supported in paragraph [0027] line 3 of the original specification.

It is believed that no new matter is added by these amendments.

Response to the Examiner's Response to Arguments

1. The Examiner maintains that thickness is optimizable, and therefore it would have been obvious to optimize for durability. Applicant respectfully disagrees – since the cited reference teaches exactly the opposite. The Kito reference teaches a thermochromic thin coating (Col. 11, lines 57-63). The Kito reference coating can be a maximum of 100 microns thick (col. 12, line 21) in order to uniformly apply the coating solution (Col. 12, line 25) by spray coating, screen printing, gravure printing, roller coating and be able to remove the solvent completely. (Col. 11, lines 57-63). Since Kito requires a coating that must dry quickly during manufacture, the only optimization of this reference is in the 2-100 micron range taught, such as 15-20 micron coating thicknesses taught by all the examples. There is necessarily a maximum thickness due to the means of application and drying requirements during manufacture. There can be no “optimization” based on the Kito reference greater than 100 microns. Applicant requires each layer to be greater than 0.1 millimeter – which is outside any range taught as possible by Kito. Applicant agrees that the Kito reference teaches the coating can be optimized within the 2-100 micron range, but specifically teaches that one cannot go above that range for the given reasons. A thickness in a region outside that taught by the reference cannot be “optimized” outside that range. One cannot “optimize” the Kito coating outside the limits taught by Kito, based on Kito. Applicant's layer range is outside the Kito limits.

2. The Examiner contends that Applicant's claim 2 (now amended into claim 1) stating that the color change is SOLEY due to the viewing angle does not exclude other ways to change color, as it falls after the transitional term "comprising". Applicant notes that the term "solely" in Applicant's claim not only comes after the transitional term "comprising" but it also comes after the body of the main claim, in the part of the claim generally referred to as the qualifying phrases. The "solely" comes after the phrase "said article" – referring back to the whole article before the transitional phrase, and therefore not related to the "comprising" language. Applicant's claim 1 states "...the article... appears different than its principal color (shows angular multichromatic characteristics) solely due to the viewing angle". This does not allow for other means of color change, as the Examiner contends.

35 U.S.C. §103

Claims 1-30 and 32 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kito et al. (US 5,585,425), as evidenced by <http://hyperphysics.phy-astr.gsu.edu/hbase/tables/indrf.html>. The Kito reference fails to teach or suggest every limitation of Applicant's claims, and therefore fails to present a *prima facie* case of obviousness. Specifically, the Kito reference fails to teach or suggest a) Applicant's claimed angular multi-chromatic characteristics, b) a thickness of each layer of greater than 0.1 to 100 mm, c) a thickness of at least one light transmitting layer of from 1 to 100 mm, d) a principal color of each layer, and e) a color change based solely on the viewing angle.

Angular multi-chromatic characteristics

Applicant's claim 1 uses "angular multi-chromatic characteristics" in describing the behavior of the claimed article as the sole means of color change in the article. Applicant believes that the Kito reference failed to recognize any angular multi-chromatic characteristics, since the Kito reference failed to describe all of the factors needed to observe such an effect – thickness of each layer of greater than 0.1, a principal color of each layer, and a thickness of at least one light transmitting layer of at least 1 mm.

Applicant agrees with the Examiner's statement on page 8, lines 1-3 of the current April 30, 2008 office action "Kito does not recognize Applicant's angular multi-chromatic characteristics". The Kito reference fails to teach or suggest said angular multi-chromatic characteristics, therefore failing to teach or suggest all of Applicant's claim limitations, resulting in a failure to present a *prima facie* case of obviousness.

Thickness of each layer of greater than 0.1 to 100 mm

The Kito reference teaches a thin coating of a thermochromatic composition. (Col 11, lines 57-63) The coating thickness is described as from 2-100 micron (Col. 12, line 12). The Kito examples all have a thermochromatic coating of 15 to 20 microns. These are all below Applicant's claims that each layer has a thickness of greater than 0.1 to 100 mm. (0.1 mm = 100 microns). The Kito disclosure and all Examples definitely teach away from Applicant's claims, and certainly would not motivate one of ordinary skill in the art to practice Applicant's claims.

The Examiner contends that the thickness is an optimizable feature, since Applicant fails to disclose any criticality with respect to the claimed thickness. Applicant respectfully disagrees. The reason the Kito reference sets an upper limit at 100 microns, is due to practical limitations of coating technology of a solvent-based coating (Col. 11, 57-53) and in order to produce a uniform coating (Col 12, line 25). Additionally, the Kito coating must rapidly respond to temperature changes, and a thick polymeric coating would serve as an insulator hindering heat transfer to all parts of the coating. Kito uses a coating, as the important feature is looking at the large surface of the object – rather than the edge. Applicant's invention is not to a coating, which produces too thin a layer, but instead relates to the angular multi-chromatic effect seen at the edge of a material. When a layer of the article is too thin – especially the light transmitting layer, it is very difficult to see the edge. That is why the light-transmitting layer needs to be even thicker – from 1 to 100 mm. (see below)

Further, according to the MPEP 2144.05. only result-effective variables can be optimized. The Kito reference fails to recognize Applicant's angular multi-chromatic characteristics or geometric multi-chromatic characteristics, and thus such effects were not recognized as result effect by Kito, and this un-recognized effect cannot be

optimized. Additionally, since the Kito reference teaches away from any coating thickness in Applicant's claimed range, one of ordinary skill in the art would not be motivated to try coating thicknesses of the higher thickness. One in the art might optimize the thickness within the 2-100 micron range taught by Kito, but would find no motivation to try any thickness outside the range.

Thickness of at least one principally-colored light-transmitting layer of from 1 to 100 mm. Applicant's claims require that the light transmitting layer be from 1 to 100mm thick. This is to provide an edge large enough to see the angular multi-chromatic characteristics of the present invention. In the Kito reference, there are 2 layers that may be light transmitting (or may be opaque):

- A. The thermochromatic layer above the trigger temperature is transparent, and may possibly be colored (Col. 12, lines 49-53). However, as noted above, this layer is at most 100 microns in thickness (and in the examples 15-20 microns). 100 micron (0.1 mm) is ten-fold below the thickness required by Applicant's claims for the light-transmitting layer. Thus Kito's thermochromatic layer falls does not teach or suggest Applicant's claimed light transmitting layer.
- B. The substrate layer: The substrate layer of Kito is described in Col. 13, lines 14 – 27. It can be either transparent or opaque. Transparent substrates are described by chemistry – with no mention of any coloring. Opaque or semi-transparent substrates are described by chemistry, with mention of “above mentioned resin colored or opacified with pigment”. Note: in Kito only the opaque or semi-transparent substrate is mentioned as possibly having a color. Both of the possible substrates described in Kito fail to teach or suggest Applicants principal-colored light transmitting layer – but rather teach away. A non-colored transparent substrate would fail to have a principle color, while a colored opaque substrate would not be light-transmitting. Thus Kito's substrate layer falls does not teach or suggest Applicant's claimed principal-colored light transmitting layer.

The Kito reference could have mentioned coloring of a transparent substrate, had that been anticipated, but instead the reference specifically

omits all references to color for a transparent substrate, but specifically mentions color only for an opaque substrate.

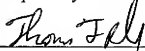
A color change based solely on the viewing angle. Applicant's have amended claim 1 to include the limitations of claim 2 – the color change of the article based solely on angular multi-chromatic characteristics as the color-changing mechanism. The Kito reference describes a thermo-chemical reaction producing a color change.

Claims 22 and 24-26 stand rejected over a Kito disclosure of a solvent (such as acetone) used between the thermochromic layer and substrate layer. Applicant would point to Kito, Col 11, line 62 – stating that solvents used in the coating are completely removed by drying – thus they no longer exist in the article.

Conclusion

The reference cited, fails to teach all of Applicant's claim elements, and therefore fail to present a *prima facie* case of obviousness over Applicant's claims. For the above reasons the present claims are believed by the Applicant to be novel and unobvious over the prior art, thus the claims herein should be allowable to the Applicant. Accordingly, reconsideration and allowance are requested.

Respectfully submitted,



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